Original Landfill Accelerated Action

Design Specifications Division 1

SPEC-01100-0972
GENERAL PROJECT DEFINITIONS

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

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PROJECT CHIEF ENGINEER DATE

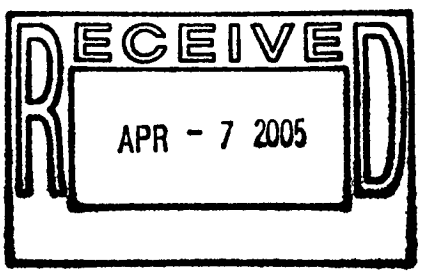
1/79

DIVISION 1 - GENERAL REQUIREMENTS

SPEC-01100-0972	General Project Definitions
SPEC-01110-0973	Summary of Work
SPEC-01300-0974	Submittal Descriptions
SPEC-01305-0975	Submittal Procedures
SPEC-01310-0976	Construction Surveying
SPEC-01401-0977	Safety, Health, and Emergency Response
SPEC-01440-0978	Contractor Quality Control
SPEC-01720-0979	Project Record Documents
SPEC-01722-0980	Field Engineering

DIVISION 2 - SITE CONSTRUCTION

SPEC-02110-0981	Site Preparation
SPEC-02200-0982	Geotechnical Testing
SPEC-02221-0983	Earthwork
SPEC-02222-0984	Drain Rock
SPEC-02223-0985	Geotextile
SPEC-02227-0986	Erosion Matting
SPEC-02228-0987	Erosion Control
SPEC-02245-0988	Stone and Aggregate Materials
SPEC-02720-0989	Liquids Removal
SPEC-02900-0990	Seeding



2

DESIGN SPECIFICATIONS

DIVISION 1 – GENERAL REQUIREMENTS

SPEC-01100-0972
GENERAL PROJECT DEFINITIONS

PART 1 GENERAL

1.01 RELATED DOCUMENTS AND DEFINITIONS

A. Drawings and general provisions of the Subcontract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section, if needed.

B. The following definitions, abbreviations, and acronyms apply to these Specifications:

1. "RFETS" means the Rocky Flats Environmental Technology Site. RFETS is a government-owned facility operated for the US Department of Energy by a primary CONTRACTOR.

2. "DOE" means the U.S. Department of Energy, which owns RFETS.

3. "CONTRACTOR" means the primary CONTRACTOR, i.e., Kaiser-Hill (K-H), L.L.C., which operates RFETS for DOE.

4. "SUBCONTRACTOR" is the construction subcontractor, Envirocon.

5. "SA" means the CONTRACTOR'S Subcontract Administrator, who has overall authority for this subcontract. The Subcontractor Administrator is Mary Kaiser.

6. "CTR" means the CONTRACTOR'S Technical Representative, who is Karen Wiemelt.

7. Construction Responsible Manger (RM) is Mike Keating of K-H.

8. Design RM is Mike Keating of K-H.

9. "DESIGNER" means the Design Authority responsible for the design package that directs the Work to be done. The DESIGNER is Earth Tech.

10. "IWCP" means Integrated Work Control Program, which is a formal planning method used to implement a set of integrated safety and compliance controls, which address activities that pose a threat to the health and safety of the public, the workers or the environment.

11. "ECR" means Engineering Change Request, which is a change to the contract drawings and/or specifications directed by the CONTRACTOR.

12. Quality assurance (QA)/quality control (QC) firm is Tetra Tech.

13. QA/QC testing company is Advanced Terra Testing under subcontract to Tetra Tech.

14. "ENGINEER: means CONSTRUCTION RM or designee

15. Construction Site Manager is Steve McQueary of Envirocon.

16. "CQAE" means Construction Quality Assurance Engineer.

17. "SQAM" means Site Quality Assurance Manager.

18. "QCSM" means Quality Control Site Manager.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Project consists of the construction of a soil cover and buttress fill at the Original Landfill at the RFETS.

B. Project Location: The RFETS is located near Golden, Colorado. See contract drawings for Vicinity and Area Plot plan.

1.03 CONTRACT, DRAWINGS AND SPECIFICATIONS

A. SUBCONTRACTOR will be furnished, without charge, sets of specifications, full-size (ANSI D) drawings, and half-size (ANSI B) drawings. A drawing list, which constitutes a part of the subcontract documents, shall include the Drawing Number, Revision Number, and Drawing Title. The SUBCONTRACTOR shall observe, and so caution any of its subcontractors, that the scales on the half-size drawings are not correct and are not usable for material take-offs.

1. Specification Format: The Construction Specification Institute (CSI) Specifications are organized into Divisions and Sections using the 16-division format and CSI "MasterFormat" number system.

2. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents.

B. If any conflicting information is found between drawings and specifications, the specifications shall overrule the drawings. SUBCONTRACTOR shall report any such conflicts to the Construction RM as soon as they are discovered.

1.04 WORK SEQUENCE

A. The Work may be conducted in phases, as proposed by the SUBCONTRACTOR and approved by the Construction RM.

B. Progress Schedules

1. The SUBCONTRACTOR shall develop a progress schedule for review and approval by the CONTRACTOR. The schedule shall be in a sufficiently detailed Critical Path Method format and shall be updated on a weekly basis unless otherwise directed in writing by the CONTRACTOR.

1.05 MISCELLANEOUS PROVISIONS

A. Change Control - All project changes that occur during construction shall be documented. Several forms of written communications shall be utilized to provide direction and document field changes during the contract:

1. Construction Field Change - A Construction Field Change is issued to the SUBCONTRACTOR by the CONTRACTOR or the SA. These changes will be incorporated into an ECR or a formal request to modify contract Drawings and/or Specifications in accordance with I-VSI-COEM-DES-210, and these changes will be formalized by a contract modification. Changes to the work package will be made in accordance with the IWCP Manual MAN-07 I-IWCP. The SUBCONTRACTOR shall immediately start work on the ECR upon receipt of the approved document.

2. Request for Information (RFI) - Design changes are to be documented with the RFI process. The SUBCONTRACTOR shall submit the RFI to the Design RM and the DESIGNER in accordance with the Construction Quality Assurance/Quality Control Plan. RFIs for scope of work modifications may not need approval from the DESIGNER if the intent of the approved design is not changed.

3. Redlined Drawings - The SUBCONTRACTOR shall maintain one (1) current set of subcontract redlined specifications and drawings at the construction site. Copies of all ECRs shall be attached to this set. The SUBCONTRACTOR shall redline all changes not reflected in contract documents modified by ECRs. The SUBCONTRACTOR shall provide to the CONTRACTOR one (1) complete set of full-size redline drawings and other documents (specifications) at the completion of the project.

B. Supervision - The SUBCONTRACTOR is required to have a full-time, non-working superintendent on-site while any work is being performed.

C. Plan of Operations - In general, there will be no stipulated sequence of construction, except for certain specific activities identified in the Planning Section of the IWCP. The SUBCONTRACTOR shall arrange his schedule such that, when work is started, work will proceed promptly and vigorously to completion.

D. Meetings - SUBCONTRACTOR'S representative will be required to attend the following meetings:

1. Pre-construction Indoctrination / Kick-off meetings

2. Weekly progress meetings

3. Periodic meetings as required to resolve issues or discuss potential changes.

4. Plan of the Day / Pre-evolution meeting

5. Representatives of lower-tier subcontractors may be required to attend some of the meetings, depending upon the meeting agenda.

PART 2 PRODUCTS

A. Products required for the work are identified in the Specifications and Drawings.

PART 3 EXECUTION (Not Applicable)

END OF SECTION

Original Landfill Accelerated Action

Design Specifications Division 1

SPEC-01110-0973
SUMMARY OF WORK

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

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PROJECT CHIEF ENGINEER DATE

SPEC-01110-0973
SUMMARY OF WORK

PART 1 GENERAL

1.01 PROJECT DESCRIPTION

A. Work covered by these Specifications and Design Drawings comprises the construction of a soil cover and buttress fill at the Original Landfill at the Rocky Flats Environmental Technology Site (RFETS), Golden, Colorado. Major items of the work include, but are not limited to:

1. Mobilization and site preparation, to include, but not be limited to:

   a. Preparation of storage areas, laydown areas, temporary soil stockpile areas, operations support areas, and access roads.

   b. Placement of access control fencing, if needed.

   c. Establishing protected site survey benchmarks to provide for readily accessible horizontal and vertical control points, if needed.

   d. Establishing of temporary haul roads.

   e. Removing trees.

   f. Empting geotechnical investigation soil from 55-gallon drums. Drums are to be disposed within the landfill limit-of-waste footprint.

2. Preparation of the existing interim cover surface, to include, but not be limited to:

   a. Staking and protection of any monitoring wells designated by the CONTRACTOR to remain after completion of the soil cover and buttress fill.

   b. Clearing and grubbing in accordance with Specification Section 02110 SITE PREPARATION.

3. Execution of a constructibility assessment or test pad. Prior to placing components of the regrade material, the SUBCONTRACTOR will establish acceptable procedures for placement of the material and demonstrate the procedures by executing a constructibility assessment pad on a small portion of the landfill. The test pad will be constructed of regrade material. Standard Proctor tests will be used on buttress fill materials and therefore a test pad is not necessary. The test fill area will have a width at least four times the equipment width and a length at least twice the equipment length. The procedures used to construct the

assessment area will demonstrate conformance with the final design specification requirements. The Colorado Department of Public Health and Environment (CDPHE) and the U.S. Environmental Protection Agency (EPA) will have the opportunity to informally evaluate this procedure prior to its use by the SUBCONTRACTOR. Once construction procedures are demonstrated that provide compliance with the specifications, the procedures will be used throughout the placement of these regrade soils and cover soils with the intent being to obtain a uniform placement and compaction of the soils within the parameters for compaction set by the final design.

4. Buttress fill placement will consist of sub-excavation to competent material at the discretion of the site geotechnical engineer followed by placement of geosynthetics (if necessary) and drain rock to design grades. Buttress fill material will then be placed to complete the buttress fill.

5. Regrade cut area of waste and place in lower portions of fill areas. All waste material must remain inside the existing waste boundary. If waste is encountered outside the current waste boundary, the waste will be relocated within the current waste boundary or the two-foot-thick soil cover will be extended over the area. Confirmation of extent will be visual.

6. With imported Rocky Flats Alluvium (RFA) material, regrade the surface as shown in the Design Drawings and in accordance with the test pad procedures discussed in Step 3. This will establish the base grade for soil cover placement.

7. Placement of the soil cover, to include but not be limited to:

   a. Placing a 24-inch layer of RFA soil directly onto the regrade surface. To minimize compaction, place full 24-inch thickness at once.

   b. Establish surface run-off controls as per the final design package, and install erosion control materials (erosion matting and riprap).

8. Demobilization. This activity will occur throughout the project as various activities are completed and equipment is no longer needed.

1.02 SUBCONTRACTOR'S USE OF PREMISES

A. SUBCONTRACTOR shall confine operations to areas within limits described in the Programmatic Biological Assessment. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed without approval of United States Fish and Wildlife Service and RFETS Ecology.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

*****END OF SECTION*****

Original Landfill Accelerated Action

Design Specifications Division 1

SPEC-01300-0974
SUBMITTAL DESCRIPTIONS

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

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PROJECT CHIEF ENGINEER DATE

SPEC-01300-0974
SUBMITTAL DESCRIPTIONS

PART 1 GENERAL

1.01 SUBMITTALS

A. The submittals described below are those required and further described in other sections of the Specifications. Other requirements pertaining to submittals are included in the SPECIAL CLAUSES and Section 01305 SUBMITTAL PROCEDURES.

1. Data. Submittals that provide calculations, descriptions, or documentation regarding the work.

2. Drawings. Submittals that graphically show the relationship of various components of the work, schematic diagrams of systems, details of fabrication, layouts of particular elements, connections, and other relational aspects of the work.

3. Instructions. Preprinted material describing installation of a product, system or material, including special notices and Material Safety Data Sheets, if any, concerning impedances, hazards, and safety precautions.

4. Schedules. Tabular lists showing location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

5. Statements. A document required by the vendor or through the vendor from a supplier, installer, manufacturer, or other lower-tier vendor, the purpose of which is to confirm the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verifications of quality.

6. Reports. Reports of inspections or tests, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used shall be identified, and test results shall be recorded.

7. Certifications. Statements signed by an official authorized to certify on behalf of the manufacturer of a product, system or material attesting that the product, system or material meets specified requirements. The statement must be dated after the award of this contract, must state the vendor's name and address, must name the project and location, and must list the specific requirements that are being certified.

8. Samples. Samples, including both fabricated and non-fabricated physical examples of materials, products, and units of work as complete units or as portions of units of work.

9. Records. Documentation to record compliance with technical or administrative requirements.

10. Operation and Maintenance Manuals. Data that form a part of an operation and maintenance manual.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 Submittals prepared pursuant to this specification shall be prepared in accordance with Section 01305 SUBMITTAL PROCEDURES.

3.02 Submittals are required for the following materials:

A. Regrade material (RFA)

B. Soil cover material (RFA)

C. Buttress fill material (engineered fill)

D. Geosynthetic materials

E. Drain rock

F. Seeding

G. Erosion Matting

3.03 Detailed construction schedule.

*****END OF SECTION*****

Original Landfill Accelerated Action

Design Specifications Division 1

SPEC-01305-0975
SUBMITTAL PROCEDURES

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

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PROJECT CHIEF ENGINEER DATE

SPEC-01305-0975
SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY (Not Applicable)

1.02 REFERENCES (Not Applicable)

1.03 RESPONSIBILITIES

A. SUBCONTRACTOR and CONTRACTOR Responsibilities

The SUBCONTRACTOR is responsible for management of his work, including scheduling, control, and submittals. The CONTRACTOR and SUBCONTRACTOR shall review each submittal for contract compliance. Submittals that do not conform will be returned to the originator to be corrected. A Submittal Register will be utilized to log and monitor all submittal activities. The SUBCONTRACTOR shall perform a check to ensure that all materials and/or equipment have been tested, submitted and approved during the preparatory phase of quality control inspections.

B. CONTRACTOR Responsibilities

The CONTRACTOR will review submittals for approval and approve those that conform to contract requirements. The approval of submittals by the CONTRACTOR shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the SUBCONTRACTOR of the responsibility for any error that may exist, as the SUBCONTRACTOR under the construction quality control (CQC) requirements of this contract is responsible for the dimensions and design of adequate connections, details and satisfactory construction of all work.

1.04 DISAPPROVED SUBMITTALS

A. The SUBCONTRACTOR shall make all corrections required by the CONTRACTOR and promptly furnish a corrected submittal in the form and number of copies as specified for the initial submittal.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 GENERAL

A. The SUBCONTRACTOR shall prepare the Submittal Register (see the Construction QA/QC Plan for example Submittal Register form). The CONTRACTOR may request submittals in addition to those listed when deemed necessary to adequately describe the work covered in the respective sections. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with all contract requirements. Prior to submittal, all items shall be checked and approved by the

SUBCONTRACTOR, and each respective Transmittal Form shall be signed and dated by the SUBCONTRACTOR certifying that the accompanying submittal complies with all the contract requirements (see the Construction QA/QC Plan for example Transmittal Form). Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: SUBCONTRACTOR'S, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; operation and maintenance (O&M) manuals, including parts lists; certifications; warranties and other such required submittals. Submittals requiring approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby.

3.02 SUBMITTAL PROCEDURE

A. All items listed on the Submittal Register shall be provided directly to the CONTRACTOR.

B. All catalog and descriptive data shall be submitted in three (3) copies. Catalog cuts and other descriptive data which have more than one model, size, or type or which shows optional equipment shall be clearly marked to show the model, size, or type and all optional equipment that is proposed for approval. Submittals on component items forming a system or that are interrelated shall be submitted at one time as a single submittal to demonstrate that the items have been properly coordinated and will function as a unit.

1. Certificates of Compliance

Each certificate shall be signed by an official authorized to certify on behalf of the manufacturing company and shall contain the name and address of the CONTRACTOR, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the CONTRACTOR from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specific requirements.

2. Deviations

The SUBCONTRACTOR shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The CONTRACTOR/ ENGINEER reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

3.03 CONTRACTOR-APPROVED SUBMITTALS

A. Upon completion of review of submittals, the submittals will be identified as having received approval by being so stamped and dated.

B. The drawing print and three (3) sets of all catalog data and descriptive literature will be given to the CONTRACTOR. After approval, the CONTRACTOR will return one to the SUBCONTRACTOR.

*****END OF SECTION*****

Original Landfill Accelerated Action

Design Specifications Division 1

SPEC-01310-0976
CONSTRUCTION SURVEYING

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

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PROJECT CHIEF ENGINEER DATE

SPEC-01310-0976
CONSTRUCTION SURVEYING

PART 1 GENERAL

1.01 SUMMARY

A. CONTRACTOR Responsibilities

1. Vertical and horizontal control shall be established by CONTRACTOR in the form of benchmarks prior to starting work at the project site. CONTRACTOR shall choose which type of surveying equipment to use (GPS, Total Station, etc.). All construction staking shall be the responsibility of CONTRACTOR. In addition, CONTRACTOR shall be responsible for reviewing all construction staking with ENGINEER and CONTRACTOR to identify the features staked.

2. Survey work shall be performed under the direction of a Professional Land Surveyor registered in the State of Colorado.

B. Primary Control Monuments

1. Established benchmarks shall be verified by CONTRACTOR to establish primary vertical and horizontal control for Work.

1.02 SUBMITTALS

A. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS and Section 01305 SUBMITTAL PROCEDURES:

1. Record Surveys.

PART 2 PRODUCTS

2.01 RECORD SURVEYS

A. Record surveys for the surfaces and layer thicknesses will include the information and details as described in the Construction QA/QC Plan. These surveys must be stamped by a Colorado licensed land surveyor and submitted to the CONTRACTOR for final acceptance.

PART 3 EXECUTION

3.01 BENCHMARKS

A. Permanent horizontal/vertical control monuments will be established at the landfill site, as appropriate.

3.02 CONSTRUCTION LINE AND GRADE

A. CONTRACTOR shall bear sole responsibility for correct transfer of construction lines and grades from benchmarks for the correct alignment and grade of completed Work

20

based on lines and grades shown on Drawings. CONTRACTOR shall establish vertical and horizontal reference control stakes in the proximity of the work.

1. Survey Reporting

   Vertical Surveys shall be reported to the nearest 0.1 foot. Horizontal surveys shall be reported to the nearest 0.1 foot.

2. Datum for Control

   Horizontal coordinates shall be based on the State Plane coordinate system. Elevations shall be based on Mean Sea Level NAV 88.

3. Construction Staking and Record Surveys

   a. Rough cut/fill stakes shall be set as needed when SUBCONTRACTOR starts construction. SUBCONTRACTOR may use laser-guided equipment.

   b. Record surveys for the required layers shall be performed as described in the Construction QA/QC Plan.

3.03 SURVEYED ITEMS

A. Record surveying will be conducted at a minimum to support the production of the following as-built record drawings. Horizontal tolerance shall be ±0.5 foot:

1. Top of regrade surface (vertical tolerance of ±0.2 foot).

2. Top of soil cover surface (vertical tolerance of –0 to +0.2 foot).

3. Top and extent of buttress fill (vertical tolerance of ±0.2 foot).

4. Buttress fill density test locations (no vertical tolerance).

5. Centerline of channels.

6. Centerline of diversion berms.

7. Final project completion site topographic map.

*****END OF SECTION*****

Original Landfill Accelerated Action

Design Specifications Division 1

SPEC-01401-0977
SAFETY, HEALTH, AND EMERGENCY RESPONSE

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

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PROJECT CHIEF ENGINEER DATE

SPEC-01401-0977
SAFETY, HEALTH AND EMERGENCY RESPONSE

PART 1 GENERAL

1.01 SUMMARY

A. Safety, health and emergency response shall be as detailed in the below-referenced plan. All work performed under the project shall comply with all applicable federal, state and local safety and occupational health rules and regulations.

1.02 REFERENCES (NOT APPLICABLE)

1.03 GENERAL REQUIREMENTS

A. Safety, health and emergency response requirements shall be as detailed in the RFETS Occupational Safety and Industrial Health Program Manual.

B. Construction Project Safety and Health Management, which includes the following elements:

1. Job Hazard Analysis (JHA). The JHA shall identify the project-specific hazards and controls that will be implemented.
2. Personal Protective Equipment. The JHA and Radiological Work Permit (RWP) shall identify the required project-specific personal protective equipment (PPE).
3. Personnel Monitoring. The JHA shall describe the personnel monitoring (e.g., dust) activities that will be performed by the SUBCONTRACTOR during construction activities.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

23

Original Landfill Accelerated Action

Design Specifications Division 1

SPEC-01440-0978
CONTRACTOR QUALITY CONTROL

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

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PROJECT CHIEF ENGINEER DATE

SPEC-01440-0978
CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.01 SUMMARY

A. Quality control shall be as described in the plans referenced below.

1.02 REFERENCES (Not applicable)

1.03 GENERAL REQUIREMENTS

A. Quality control requirements shall be as detailed in the project-specific Construction Quality Assurance/Quality Control Plan of the Accelerated Action for the Original Landfill.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.01 GENERAL

A. Quality control actions shall be performed by the CONTRACTOR and SUBCONTRACTOR as detailed in the Construction Quality Assurance/Quality Control Plan, of the Accelerated Action for the Original Landfill.

*****END OF SECTION*****

25

Original Landfill Accelerated Action

Design Specifications Division 1

SPEC-01720-0979
PROJECT RECORD DOCUMENTS

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

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PROJECT CHIEF ENGINEER DATE

SPEC-01720-0979
PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Maintain at site one record copy of:

1. Design Drawings and Specifications.
2. Work control documents.
3. Addenda.
4. Approved submittals.
5. Field test records.
6. Associated permits.
7. Certificates of inspection and approvals.

1.02 SUBMITTALS

A. General

1. At Substantial Completion:

a. Deliver one set of as-built construction Drawings and Specifications to CONTRACTOR for use in preparation of the construction project record file for the project components listed in Specification Section 01310 CONSTRUCTION SURVEYING.

B. Transmittal Letters

1. Accompany submittals with transmittal letter containing following:

a. Date.

b. Project title and number.

c. SUBCONTRACTOR'S name and address.

d. Title of record document.

e. Signature of SUBCONTRACTOR or authorized representative.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 RECORD DOCUMENTS

A. Alterations - Maintain record set of Design Drawings and Specifications legibly annotated to show all changes made during construction.

1. Graphically depict changes by modifying or adding to plans, details, or sections. Changes in horizontal location and associated elevations shall be transmitted to the CONTRACTOR via the survey data; however, obvious changes to the plans shall be noted on the Design Drawings with reference to survey data providing more precise information.

2. Make changes on each sheet affected by changes.

3. Do not conceal work until required information is recorded.

4. Record changes made by Written Amendment, Field Order, Change Order, RFI, or Work Directive Change.

B. Drawings

1. General

a. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

b. Location of utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.

c. Field changes.

d. Details not on original Design Drawings.

2. Specifications

a. Mark Specification sections to show substantial variations in actual work performed in comparison with test of Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation.

b. Note related record drawing information and product data.

END OF SECTION

Original Landfill Accelerated Action

Design Specifications Division 1

SPEC-01722-0980
FIELD ENGINEERING

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

_____ _____

PROJECT CHIEF ENGINEER DATE

SPEC-01722-0980
FIELD ENGINEERING

PART 1 GENERAL

1.01 SUMMARY

A. All survey control work will be performed by the CONTRACTOR. CONTRACTOR shall choose which type of surveying equipment to use (GPS, Total Station, etc.). All surveys will be performed under the direction of a Licensed Surveyor in the State of Colorado and in accordance with all applicable surveying codes.

1.02 PRIMARY CONTROL MONUMENT

A. Bench marks, monuments or references provided by CONTRACTOR to establish primary vertical control for Work are indicated on Drawing 51781-004.

B. Protect and maintain primary control monuments shown on Drawings throughout Project area.

1.03 PRIMARY LINE AND GRADE

A. Primary line and grade will be provided by CONTRACTOR and established by SUBCONTRACTOR by means of stakes placed at site of Work.

B. Stakes for construction will be set:

1. **50 ft x 50 ft** grid lines over Project Site or as directed by Construction RM.

2. At changes in grade.

3. Offset to best serve SUBCONTRACTOR.

C. Stakes for excavation and embankment will be set:

1. Parallel to toe of slope at **50** ft intervals or as directed by Construction RM.

2. Offset to best serve SUBCONTRACTOR.

D. SUBCONTRACTOR shall:

1. Provide assistance as required.

2. Arrange operations to avoid interference with establishment of primary lines and grades.

3. Check accuracy of line and grade by visual inspection, checks between stakes, and periodic checks (with surveying equipment) between primary control monuments and stakes.

4. Protect and preserve stakes.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

*****END OF SECTION*****

DESIGN SPECIFICATIONS

DIVISION 2 – SITE CONSTRUCTION

Original Landfill Accelerated Action

Design Specifications Division 2

SPEC-02110-0981
SITE PREPARATION

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

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PROJECT CHIEF ENGINEER DATE

SPEC-02110-0981
SITE PREPARATION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:

1. Protection.

2. Preparation.

3. Clearing and grubbing.

4. Restoration.

1.02 DEFINITIONS

A. Structures and Surface Features

1. Existing structures and surface features including buildings, pavements, signs, posts, fences, and other miscellaneous items.

B. Utilities

1. Existing gas mains, water mains, steam lines, electric lines and conduits, telephone and other communication lines, pole, and conduits, sewer pipe, cable television, other utilities, and appurtenances.

C. Clearing and Grubbing

1. Cutting and disposing of trees, brush, windfalls, logs, grasses, and other vegetation, and removing and disposing of roots, stumps, stubs, grubs, logs, and other timber.

1.03 CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

A. The SUBCONTRACTOR shall abide by all qualification and submittal requirements of the Construction Quality Assurance/Quality Control (QA/QC) Plan and the RFETS Work Control Document(s).

B. The work will be monitored and tested at the appropriate frequencies in accordance with the requirements of the approved QA/QC Plan.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 PROTECTION

A. Existing utilities shall be protected against damage. The SUBCONTRACTOR shall contact the CONTRACTOR for marking (or verifying) utility locations before beginning excavation. If uncharted utilities are encountered during excavation, stop work in the immediate area or as appropriate and notify CONTRACTOR and the appropriate utility provider.

B. The SUBCONTRACTOR shall preserve and protect groundwater-monitoring wells.

3.02 CLEARING AND GRUBBING

A. The SUBCONTRACTOR shall remove vegetation and incorporate with the grade fill within defined limits of waste boundary, as shown on the design drawings, at the location(s) specified by the CONTRACTOR. Vegetation to be removed and incorporated includes grasses and other perishable or degradable organic matter. Settlement calculations include an assumption of waste material at a mid-level organic content; therefore, leaving some grubbed material within the regrade material is acceptable.

*****END OF SECTION*****

Original Landfill Accelerated Action

Design Specifications Division 2

SPEC-02200-0982
GEOTECHNICAL TESTING

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

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PROJECT CHIEF ENGINEER DATE

SPEC-02200-0982
GEOTECHNICAL TESTING

PART 1 GENERAL

1.01 SUMMARY

A. Specifications and guidelines for the geotechnical testing of the soils to be used during construction. Soils to be tested include:

1. Regrade material (Rocky Flats Alluvium)

2. Buttress fill material

3. Soil cover material (Rocky Flats Alluvium)

B. All activities performed by the SUBCONTRACTOR shall be in accordance with all applicable Federal, State, and local laws and regulations.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. D 422 Standard Test Method for Particle Size Analysis of Soils

2. D 698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (Standard Proctor)

3. D 4318B Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)

B. Relevant Publications:

1. U.S. EPA (2002), *Technical Guidance for RCRA/CERCLA Final Covers.*

2. U.S. EPA (1993), *Technical Guidance Document, Quality Assurance and Quality Control for Waste Containment Facilities* EPA/600/R-93/182.

3. R.M. Koerner (1999), *Designing with Geosynthetics.*

1.03 DEFINITIONS

A. CONTRACTOR – Kaiser-Hill Company, L.L.C.

B. CTR – Contractor Technical Representative

C. Geotechnical Laboratory (TESTING LABORATORY) - Party, which is independent from the MANUFACTURER, responsible for conducting laboratory tests on samples prior to construction, under the direction of the CONTRACTOR.

D. SUBCONTRACTOR – Company performing construction activities.

1.04 SUBMITTALS

A. The SUBCONTRACTOR will prepare the following submittals for review by the CONTRACTOR and the Quality Control Site Manager (QCSM) in accordance with Section 01305 SUBMITTAL PROCEDURES:

1. Prior to and after testing:

a. Information from the selected quarry or borrow area for the Rocky Flats Alluvium. At a minimum, location, size, and any geotechnical data, if available.

b. Information from the selected quarry or borrow area for the buttress fill material. At a minimum, location, size and any geotechnical data, if available.

c. TESTING LABORATORY results for the tests described in Part 3.03.

2. Submit in accordance with Section 01305 SUBMITTAL PROCEDURES.

1.05 CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL

A. The SUBCONTRACTOR shall abide by all qualification and submittal requirements of the QA/QC Plan and the Work Control Document(s) (WCD).

B. The work will be monitored and tested at the appropriate frequencies in accordance with the requirements of the approved QA/QC Plan.

PART 2 PRODUCTS

2.01 REGRADE MATERIAL - Soil as defined in Section 02221 and characterized in conformance with Section 02200.

2.02 BUTTRESS FILL MATERIAL - Soil as defined in Section 02221 and characterized in conformance with Section 02200.

2.03 SOIL COVER MATERIAL - Soil as defined in Section 02221 and characterized in conformance with Section 02200.

PART 3 EXECUTION

3.01 SUBMIT MATERIALS TO TESTING LABORATORY

A. Upon consultation with the CONTRACTOR, submit samples from quarry or borrow area to characterize the material. If borrow area is within the RFETS, coordinate sampling effort with CONTRACTOR.

3.02 SUBMIT TEST SPECIFICATIONS TO TESTING LABORATORY

A. Specify 95% standard Proctor for consolidation and shear testing.

B. Specify shear tests to be conducted at three normal stresses of 3 pounds per square inch (psi), 6 psi, and 9 psi or as otherwise directed by the CONTRACTOR.

3.03 GEOTECHNICAL TESTS

A. TESTING LABORATORY will conduct the following tests under conditions outlined in Section 3.02 for Buttress fill Material and Soil Cover Material, as defined in Section 02221. Tests to be conducted at frequencies in accordance with the approved QA/QC Plan include:

1. D 422 Standard Test Method for Particle Size Analysis of Soils

2. D 698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (Standard Proctor) – if applicable

3. D 4318B Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils (Atterberg Limits)

B. TESTING LABORATORY results to be submitted to CONTRACTOR for possible design modifications.

*****END OF SECTION*****

Original Landfill Accelerated Action

Design Specifications Division 2

SPEC-02221-0983
EARTHWORK

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

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PROJECT CHIEF ENGINEER DATE

SPEC-02221-0983
EARTHWORK

PART 1 GENERAL

1.01 SUMMARY

A. This section includes definitions of materials, required submittals, and procedures that will be required to place regrade material, soil cover material, and buttress fill material. Drain rock is covered under Specification Section 02222 DRAIN ROCK.

1.02 DEFINITIONS

A. INTERIM COVER SOILS

Any materials generated from breaking the plane of the existing Interim Cover of the landfill for purposes of manipulating the surface contours or elevations of the Interim Cover in order to establish initial slopes or contours required in accordance with the design drawings.

B. REGRADE MATERIAL

Rocky Flats Alluvium (RFA) soil from a CONTRACTOR-approved borrow source which does not visually contain waste materials, ice and/or snow, organic soils, vegetation, wood, peat, or other unsuitable material as determined by the QCSM. Regrade material shall be a material that is readily capable of being compacted in accordance with the test fill program discussed in Specification Section 01110 SUMMARY OF WORK. The regrade material will be used to reach the slope and contours of the Drawings.

C. BUTTRESS FILL MATERIAL

Soil from a CONTRACTOR-approved borrow source which does not visually contain waste materials, ice and/or snow, organic soils, vegetation, wood, peat, or other unsuitable material as determined by the QCSM, and meets gradation listed in Table A of this section. Buttress fill material shall be a material that is readily capable of being compacted as an engineered fill, as defined by geotechnical testing performed in accordance with Section 02200 GEOTECHNICAL TESTING, It will be used to construct the buttress.

D. SOIL COVER MATERIAL

RFA from a CONTRACTOR-approved borrow source which does not visually contain waste materials, ice and/or snow, as determined by the QCSM.

E. GEOGRID

A biaxial polymeric grid formed by a regular network of integrally connected tensile elements with apertures of sufficient size to allow interlocking with surrounding soil, rock, or earth to function primarily as reinforcement. Use Tensar BX1200 or equivalent.

41

F. EXCAVATED SOIL

Soil excavated from the buttress area may be blended with the RFA soil to be used as soil cover material.

1.03 SUBMITTALS

A. The SUBCONTRACTOR will prepare the following submittals for review by the CONTRACTOR in accordance with Section 01305 SUBMITTAL PROCEDURES:

1. Proposed Equipment

2. Geotechnical test results demonstrating soil source compliance with this specification and the Construction QA/QC Plan.

1.04 CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL

A. The SUBCONTRACTOR shall abide by all qualification and submittal requirements of the QA/QC Plan and the Work Control Document(s) (WCD).

B. The work will be monitored and tested at the appropriate frequencies in accordance with the requirements of the approved QA/QC Plan.

PART 2 MATERIALS

2.01 REGRADE MATERIAL

A. Supply per definition above.

2.02 BUTTRESS FILL MATERIAL

A. Supply per definition above.

2.03 SOIL COVER MATERIAL

A. Supply per definition above.

2.04 GEOGRID

A. Supply per definition above.

B. The SUBCONTRACTOR shall check the geogrid upon delivery to verify that the proper material has been received. The geogrid shall be inspected by the CONTRACTOR to be free of flaws or damage occurring during manufacturing, shipping, or handling.

C. Store to prevent excessive mud or other deleterious materials from coming in contact with and affixing to the geogrid materials and at temperatures above -20 degrees F. Geogrid materials should not be left directly exposed to sunlight for a period longer than recommended by the manufacturer.

PART 3 EXECUTION

3.01 PREPARATION

A. Before commencement of construction of the soil cover, the area shown on the Drawings shall be prepared in accordance with the following:

1. Place temporary erosion protection as required per Section 02228 EROSION CONTROL.

2. Clear and grub in accordance with Specification Section 02110 SITE PREPARATION.

3. The landfill regrade cut and fill depth, thicknesses, and elevations shown in the drawings shall be established in accordance with standard construction staking practice and to tolerances established in this section. and in accordance with Section 01722 FIELD ENGINEERING. All staking shall be maintained as required to support construction activities necessary to establish the landfill regrade surface as portrayed in the project Design Drawings.

4. If possible, remove unsuitable material identified during proof-rolling or bridge the area with material capable of adequately limiting deflection. Proof roll and repeat as necessary.

5. Assure fill area is not impacted by ice, snow, and/or frozen material prior to beginning placement.

3.02 EXCAVATION/REGRADING

A. Regrade materials will be placed and compacted into the fill areas shown on the drawings.

1. During excavation of materials from or within the existing interim cover of the Landfill, follow all instruction and requirements of the Work Control Document(s) as they relate to the exposure and monitoring of waste, and subsequent decontamination procedures as appropriate. Transport excavated materials to fill area.

2. All regraded waste material will be thoroughly compacted with an 825 compactor or similar equipment. All areas where waste has been exposed will be compacted.

3. Placement of REGRADE MATERIAL may be required to maintain positive drainage if excavation extends beyond the limit of excavation shown on the Drawings or below excavation grades shown. Regrade material shall be placed in accordance with Section 3.04 of this Specification and as such to facilitate the placement of overlying fill and cover materials. If saturated soil/material is encountered at a depth greater than 2 feet, placement of bridging materials (e.g., washed rock in excess of 1-1/2 inch minimum dimension) in the area, or other methods approved by the DESIGNER to improve bearing capacity will be performed.

3.03 DEWATERING

A. If dewatering is required, the following procedure shall be initiated:

1. If necessary, provide surface water pumps, hoses and other necessary equipment and labor to keep excavation free of standing water. Water coming in contact with soil shall be collected and disposed per site procedures.

3.04 REGRADE MATERIAL PLACEMENT

A. For the execution of the regrade preparation cut and fill program, the following placement procedure shall be initiated where placement is required:

1. Begin construction of regrade fill at lowest point of fill below grade and construct in layers by spreading and leveling material during placement. Spread individual layers to uniform thickness throughout and approximately parallel with finished grade within current working area of fill placement. Step transition between work areas as filling progresses to prevent vertical joints within fill.

2. Place materials uniformly in maximum 1-foot loose lifts within current working area of fill placement.

3. Compact REGRADE MATERIAL in accordance with the test fill program discussed in Specification Section 01110 SUMMARY OF WORK observed and documented by the QCSM.

4. Maintain lifts to provide positive drainage away from construction.

5. Where material for fill consists of rock, rubble, or waste material of such size as to render placing in 1-foot layers impractical, material may be placed in layers not exceeding in thickness the approximate average size of larger materials provided individual pieces are so placed that there will be no nesting and voids are filled with smaller soil or waste materials.

6. Do not place frozen materials and do not place materials on frozen surfaces. Frozen materials are defined as soil with a temperature less than 32°F or containing visible ice crystals, or clods of frozen soil larger than 4 inches in any direction.

7. Saturated soil shall be spread over an area to receive fill and shall be allowed to air dry to a sufficient state that it may be compacted and may serve as adequate material for placement of overlying fill and cover materials.

3.05 BUTTRESS FILL MATERIAL PLACEMENT

A. For the execution of the buttress fill construction, the following placement procedure shall be initiated:

1. Place buttress fill material in accordance with this Specification and the approved Design Drawings and Design report.

2. The footprint surface shall be prepared by stripping and removing all vegetation, root matter, and other organics and deleterious materials from the buttress foundation area, as shown on the Drawings. In addition to stripping, soft, unconsolidated fine-grained alluvium materials (such as Unified Soil Classification System CH, CL, and ML materials), particularly highly plastic clays, shall be removed to a firm/dense condition judged suitable for the buttress foundation, as determined in the field during construction by a site engineer or geologist. The final foundation surface shall be in a condition to accept installation of the geogrid per the manufacturer's recommendation and is anticipated to be a relatively dense granular material (such as Unified Soil Classification System SC or GC, SW or SP, or GW or GP materials). The anticipated average excavation depth for foundation preparation is 2 feet. The final excavation depth and requirements are subject to adjustment in the field during construction as determined by a site engineer or geologist. All final foundation surfaces shall be approved by the site engineer or geologist prior to placement of materials for buttress and blanket drain construction. Excavated soils may be placed within the limits of cover outside the buttress footprint.

3. Install Tensar BX1200 or equivalent biaxial geogrid on the base of the sub-excavation per manufacturer's recommendations. The geogrid shall be laid smooth and free of tension, stress, folds, wrinkles, or creases. If more than one strip is necessary, the geogrid strips shall be overlapped and installed per the geogrid manufacturer's recommendations. If repairs are necessary, follow manufacturer's recommendations.

4. Place drain rock according to Specification Section 02222 DRAIN ROCK and Design Drawings.

5. Place materials in 1-foot lifts to accommodate establishing grade of the final surface and to account for settlement due to grading. Ensure that the material meets the gradation listed in Table A of this section. If necessary, remove larger cobbles and break down clods. In general, the buttress fill material will meet the physical characteristics of the "pit fine" soils detailed in Appendix G of the Design.

TABLE A

Sieve Size	Percent Finer
0.75 in.	100.0
0.375 in.	95 – 100
#4	80 – 95
#10	65 – 80
#20	50 – 65
#40	40 – 55
#60	35 – 45
#100	30 – 40
#200	20 – 30

6. See QA/QC Plan Table 7.1 for buttress fill soil testing requirements.

7. Materials shall be placed at a final compaction of 95 percent standard Proctor dry density (ASTM D698) with a moisture requirement of ±2 percent of the optimum moisture content (OMC) as measured by standard Proctor density (ASTM D698).

8. Where density testing is required by the Specifications, either nuclear density meter, sand cone, or rubber balloon test methods will be used for the field testing of the in-situ dry unit weight and moisture content of the in-place, compacted fill. One sand cone test (ASTM D 1556) or rubber balloon test (ASTM D 2167) and one laboratory moisture content (ASTM D 2216) test will be conducted per 20 nuclear density tests (ASTM D 2922) to calibrate the results of the nuclear density meter. If consistent calibration is demonstrated, frequencies may be reduced. Allowable moisture and dry density correlation deviation limits are presented in the Specifications. Any discrepancies between test results will be resolved by the QCSM and the Site Quality Assurance Manager (SQAM).

8. If an in-place density test result fails to meet the Specifications, a confirmatory test will be performed immediately adjacent to the failed test. If the confirmatory test meets or exceeds the Specifications, a second confirmatory test will be performed at a second location immediately next to the failed test. If the second confirmatory test also meets or exceeds the Specifications, the area will be declared as meeting project Specifications and the confirmatory tests will be reported. If either confirmatory test fails to meet the Specifications, additional testing as defined by the QCSM and SQAM will be performed to identify the limits of the area that does not meet project Specifications. These areas will be reworked or the failing soils will be removed and replaced, and retesting will be performed until passing results are obtained.

3.06 SOIL COVER MATERIAL PLACEMENT

A. For the execution of the final grade preparation program, the following placement procedure shall be initiated:

1. Place soil cover material (RFA) in accordance with this Specification and the approved Design Drawings and Design report. The QCSM must verify the underlying surface is clean, free of all foreign substances, not disturbed by traffic or other operations, is maintained in a satisfactory condition, and accepted by the SQAM prior to the placement of SOIL COVER MATERIAL.

2. Soil from the buttress excavation may be blended with RFA for use as cover soil.

3. Limit construction traffic to avoid over-compaction.

4. Evenly spread materials on the top surface to match final grading requirements as depicted in the Design Drawings using a Caterpillar low-ground pressure (LGP) D-6 bulldozer (or equivalent). The final required deposited thickness of the final cover soil layer will be a minimum of 2 feet. The verification of final thickness will be by grade stakes and surveying. The diversion berms will be constructed at the same time as the cover soil to avoid soil compaction.

3.07 FIELD QUALITY ASSURANCE/QUALITY CONTROL

A. Grade Fill Placement and Compaction

1. In accordance with the Construction QA/QC plan.

B. Tolerances

1. See Specification Section 01310 CONSTRUCTION SURVEYING for tolerances.

C. Final Grades

1. In accordance with the QA/QC Plan, the completed design subgrades shall be surveyed by CONTRACTOR and approved by the QCSM and SQAM before further placement of cover materials.

*****END OF SECTION*****

Original Landfill Accelerated Action

Design Specifications Division 2

SPEC-02222-0984
DRAIN ROCK

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

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PROJECT CHIEF ENGINEER DATE

SPEC-02222-0984
DRAIN ROCK

PART 1 GENERAL

1.01 SUMMARY

A. This Specification section covers the supply, installation, and testing of materials for use in construction of the buttress fill drain rock as indicated in the Design Drawings. All activities performed by the SUBCONTRACTOR shall be in accordance with all applicable Federal, State, and local laws and regulations.

1.02 REFERENCES

A. The publications listed below form a part of the Specification to the extent referenced. The publications are referred to in the text by basic designation only. The most recent version of the referenced test methods shall be used in all cases.

1. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

a. ASTM C 88 Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate

b. ASTM C 127 Specific Gravity and Absorption of Coarse Aggregates

c. ASTM C 131 Resistance to Degradation of Small-size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

d. ASTM C 136 Method for Sieve Analysis of Fine and Coarse Aggregates

e. ASTM D 2938 Standard Test Method for Unconfined Compressive Strength of Intact Rock Core Specimens

1.03 SUBMITTALS

A. The SUBCONTRACTOR will prepare the following submittals for review by the CONTRACTOR and the QCSM in accordance with Section 01305 SUBMITTAL PROCEDURES:

1. Suppliers' Test Results demonstrating compliance with Part 2 of this Specification.

1.04 EQUIPMENT

A. All equipment and tools used in the performance of the work will be subject to approval by the CONTRACTOR before the work is started and shall be maintained in satisfactory working condition at all times.

49

1.05 CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL

A. The SUBCONTRACTOR shall abide by all qualification and submittal requirements of the QA/QC Plan and the Work Control Document(s) (WCD).

B. The work will be monitored and tested at the appropriate frequencies in accordance with the requirements of the approved QA/QC plan.

PART 2 PRODUCTS

2.01 DRAIN ROCK

A. Properties:

1. Stone used for drain rock shall be hard, dense, subangular in shape, resistant to weathering, and free from seams, cracks, or other structural defects. The drain rock must be poorly sorted from coarse to fine, falling within the limits of the gradation requirements, given in Table A:

Table A

D_{XX} (Stone Size)	D_{xx} Stone Size (inches)	Percent Smaller
D_{max}	4	100
D_{85}	0.5	85
D_{10}	0.0165	10

2. See QA/QC Table 7.1 for drain rock testing requirements.

3. Prior to the placement of drain rock below the buttress, a representative drain rock sample shall be collected and tested using ASTM D2434-68 (2000) *Standard Test Method for Permeability of Granular Soils*. If the compacted permeability falls below the estimated design permeability (29.5 gal/day/ft), then the thickness of the drain rock will require modifications to compensate for actual permeability.

B. Control of gradation will be by supplier's sieve analysis in accordance with the QA/QC Plan.

PART 3 EXECUTION

3.01 PREPARATION

A. Areas on which drain rock materials will be placed shall be graded and dressed to lines and grades shown on drawings and in accordance with Section 02110 SITE PREPARATION and Section 02221 EARTHWORK. Eroded or washed out areas shall be repaired prior to placement of material.

SO

3.02 DRAIN ROCK MATERIAL

A. General

1. Drain rock material shall be placed on the approved regrade surface within the limits and thickness shown on the drawings or as staked in the field. See Specification Section 01310 CONSTRUCTION SURVEYING for tolerances.

B. Placement

1. Prior to placement, the QCSM must ensure that the underlying surface is in satisfactory condition and accepted by the SQAM. Drain rock material shall be spread uniformly and approved by QA/QC personnel to the slope lines, thickness, and grades indicated on the Drawings or as directed.

*****END OF SECTION*****

Original Landfill Accelerated Action

Design Specifications Division 2

SPEC-02223-0985
GEOTEXTILE

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

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PROJECT CHIEF ENGINEER DATE

52

SPEC-02223-0985
GEOTEXTILE

PART 1 GENERAL

1.01 SUMMARY

A. CONTRACTOR shall furnish all geotextile, labor, incidental materials, tools, supervision, transportation, and installation equipment necessary for the installation of geotextile, as specified herein, and as shown on the Drawings.

1.02 REFERENCES

A. ASTM D 5261 Standard Test Method for Measuring Mass per Unit Area of Geotextiles

B. ASTM D 4632 Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

C. ASTM D 4533 Standard Test Method for Index Trapezoidal Tearing Strength of Geotextiles

D. ASTM D 4833 Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products

E. ASTM D 4491 Standard Test Method for Water Permeability of Geotextiles by Permittivity

F. ASTM D 4751 Standard Test Method for Determining Apparent Opening Size of a Geotextile

G. ASTM D 4354 Standard Practice for Sampling of Geosynthetics for Testing

H. ASTM D 4759 Standard Practice for Determining the Specifications Conformance of Geosynthetics

1.03 SUBMITTALS

A. The SUBCONTRACTOR will prepare the following submittals for review by the CONTRACTOR and the QCSM in accordance with Section 01305 SUBMITTAL PROCEDURES:

1. The SUBCONTRACTOR shall provide the CQAE with a written certification or manufacturers quality control data which displays that the geotextile meets or exceeds minimum average roll values (MARV) specified herein.

2. The SUBCONTRACTOR shall submit manufacturer's quality control specifications for the geotextile to be delivered to the site to the CONTRACTOR.

53

1.04 CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL

A. The SUBCONTRACTOR shall abide by all qualification and submittal requirements of the QA/QC Plan and the Work Control Document(s) (WCD).

B. The work will be monitored and tested at the appropriate frequencies in accordance with the requirements of the approved QA/QC plan.

PART 2 PRODUCTS

2.01 GEOTEXTILE

A. The nonwoven needle-punched geotextile specified herein shall be made from polypropylene staple or continuous fiber.

B. The geotextile shall be manufactured from first-quality virgin polymer.

C. The geotextile shall be able to withstand direct exposure to ultraviolet radiation from the sun for up to 15 days without any noticeable effect on index or performance properties.

D. Geotextile shall meet or exceed all material properties listed in Table A.

MARV required for the 8-ounce nonwoven, needle-punched geotextiles are listed in Table A:

Table A

Tested Property	Units	Test Method	Frequency	Value
Mass per unit area	oz/yd^2	ASTM D 5261	90,000 ft^2	8
Grab tensile strength	lb	ASTM D 4632	90,000 ft^2	220
Grab elongation	%	ASTM D 4632	90,000 ft^2	50
Puncture Strength	lb	ASTM D 4833	90,000 ft^2	120
Trapezoidal tear strength	lb	ASTM D 4533	90,000 ft^2	95
Apparent opening size	Sieve No.	ASTM D 4751	540,000 ft^2	80
Permittivity	sec^{-1}	ASTM D 4491	540,000 ft^2	1.5
Permeability	cm/sec	ASTM D 4491	540,000 ft^2	0.30
Water flow rate	gpm/ft^2	ASTM D 4491	540,000 ft^2	85

Notes:

oz = ounces
lb = pound
cm = centimeters
yd^2 = square yard
% = percent
gpm = gallons per minute
sec^{-1} = second
ft^2 = square foot
sec = second

PART 3 EXECUTION

3.01 TRANSPORT

A. Transportation of the geotextile shall be the responsibility of the SUBCONTRACTOR.

B. During shipment, the geotextile shall be protected from exposure to ultraviolet light, precipitation, mud, dirt, dust, puncture, or other damaging or deleterious conditions.

C. Upon delivery at the job site, the SUBCONTRACTOR shall ensure that the geotextile rolls are handled and stored in accordance with the manufacturer's instructions to prevent damage.

3.02 QUALITY ASSURANCE

A. The work will be monitored and tested at the appropriate frequencies in accordance with the requirements of the approved QA/QC Plan. The SUBCONTRACTOR shall account for these monitoring and testing activities in the construction schedule.

1. The QCSM and SQAM shall examine the geotextile rolls upon delivery to the site and report any deviations from project specifications to the CONTRACTOR.

3.03 INSTALLATION

A. Should the SUBCONTRACTOR damage the geotextile to the extent that it is no longer usable as determined by these Specifications or by the Engineer, the SUBCONTRACTOR shall replace the geotextile at his own cost.

B. The geotextile shall be installed to the lines and grades as shown on the contract Drawings and as described herein.

C. The geotextile shall be rolled down the slope in such a manner as to continuously keep the geotextile in tension by self weight. The geotextile shall be securely anchored in an anchor trench where applicable or by other approved or specified methods.

D. In the presence of wind, all geotextiles shall be weighted by sandbags or approved equivalent. Such anchors shall be installed during placement and shall remain in place until replaced with cover material.

E. The SUBCONTRACTOR shall take necessary precautions to prevent damage to adjacent or underlying materials during placement of the geotextile. Should damage to such material occur due to the fault of the SUBCONTRACTOR, the latter shall repair the damaged materials to the satisfaction of the Engineer.

F. During placement of the geotextile, care shall be taken not to entrap soil, stones or excessive moisture that could hamper subsequent seaming of the geotextile as judged by the Engineer.

G. The geotextile shall not be exposed to precipitation prior to being installed and shall not be exposed to direct sunlight for more than 15 days after installation.

H. The geotextile shall be covered as soon as possible after installation and approval. Installed geotextile shall not be left exposed for more than 15 days.

I. Material overlying the geotextile shall be carefully placed to avoid wrinkling or damage to the geotextile.

*****END OF SECTION*****

Original Landfill Accelerated Action

Design Specifications Division 2

SPEC-02227-0986
EROSION MATTING

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

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PROJECT CHIEF ENGINEER DATE

SPEC-02227-0986
EROSION MATTING

ATTACHMENTS: Staple Patterns "A" through "E" from North American Green

PART 1 GENERAL

1.01 SUMMARY

A. This Specification section covers the supply and installation of erosion controls for the channels and slopes of the embankments as shown on the Drawings. All activities performed by the SUBCONTRACTOR at any tier shall be in accordance with all applicable Federal, State, and local laws and regulations.

B. General erosion control matting for construction will be dictated by RFETS erosion control procedures.

1.02 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. The most recent version of the reference test methods shall be used in all cases.

1. American Society for Testing and Materials (ASTM)

a. ASTM D 1682 Standard Test Method for Measuring Tensile Strength and Percent Strength Retention of Material after 1000 hours of Exposure in Xenon-Arc Weatherometer

b. ASTM D 4355 Standard Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)

c. ASTM D 5035 Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)

d. ASTM D 5199 Standard Test Method for Measuring Thickness of Textile Materials

e. ASTM D 5261 Standard Test Method for Mass Per Unit Area of Geotextiles

1.03 GENERAL

A. The SUBCONTRACTOR shall implement the storm water pollution prevention measures specified in this section and in Section 02228 EROSION CONTROL in a manner which will ensure that soils are retained on-site.

S7

1.04 SUBMITTALS

A. The SUBCONTRACTOR will prepare the following submittals for review by the CONTRACTOR and the QCSM in accordance with Section 01305 SUBMITTAL PROCEDURES:

1. Manufacturing, Sampling, and Testing

a. A minimum of 14 days prior to scheduled use, erosion mat manufacturer's quality control manual, including instructions for storage, handling, installation, seaming, and repair.

2. Erosion Mat

a. A minimum of 14 days prior to scheduled use, Manufacturer's Certificate of Compliance stating that the erosion mat meets the requirements of this section. This submittal shall include copies of manufacturer's quality control test results. The Certificate of Compliance shall be attested to by a person having legal authority to bind the erosion mat manufacturing company.

1.05 CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL

A. The SUBCONTRACTOR shall abide by all qualification and submittal requirements of the QA/QC Plan and the Work Control Document(s) (WCD).

B. The work will be monitored and tested at the appropriate frequencies in accordance with the requirements of the approved QA/QC plan.

PART 2 PRODUCTS

2.01 SYNTHETIC EROSION CONTROL MATERIALS

A. The synthetic erosion control shall be North American Green (NAG) C125 or equivalent. The coconut fiber shall be evenly distributed over the entire area of the mat. The blanket shall be covered on the top and bottom with heavyweight polypropylene netting having ultraviolet additives to delay breakdown and an approximate 0.625 x 0.625 inch (1.59 x 1.59 centimeter [cm]) mesh size. Table A contains further physical properties of the C125 erosion control blanket.

Table A

Material Content	
Coconut Fiber	100% (0.50 lb./yd^2)
Netting	Both sides, heavyweight UV-stabilized (3 lb/1,000 ft^2 approximate weight)
Thread	100% black polypropylene
Physical Specifications (Roll)	
Width	6.67 feet
Length	108 feet
Weight	40 pounds +/- 10 percent
Area	80 yd^2
Stitch spacing	1.5 inches

B. Permanent erosion control material shall be NAG C350 and/or P550 or equivalent at locations as shown on the Drawings.

The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between a super-heavy-duty UV-stabilized bottom net with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings, an ultra-heavy-duty UV stabilized, dramatically corrugated (crimped) intermediate netting with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings. The corrugated netting shall form prominent, closely spaced ridges across the entire width of the mat.

All mats shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches [5-12.5 cm] from the edge) as an overlap guide for adjacent mats.

PART 3 EXECUTION

3.01 INSTALLATION OF SYNTHETIC EROSION CONTROL MATERIAL IN CHANNELS

A. Placement

1. Begin 10 feet back from the top of the channel by anchoring the blanket in a 6-inch deep by 6-inch wide trench. Staple into trench and backfill per manufacturer's recommendations.

2. Roll center blanket in direction of water flow on bottom of channel.

3. Place blankets end over end (shingle style) with a 6-inch overlap. Use a double row of staggered staples 4 inches apart (or an alternative method approved through the RFI process) to secure blankets.

4. Full-length edge blankets at top of side slopes must be anchored in 6-inch-deep by 6-inch-wide trenches. Staple into trench and backfill per manufacturer's recommendations.

5. Blankets on side slopes must be overlapped 4 inches (2 inches for NAG C350 matting) over the center blanket and stapled.

6. Staple the entire length over the width of the channel. Staple pattern "E" will be used for both east and west channels. All erosion blankets shall receive staples as shown on the Drawings. See Section 3.04 for staple patterns.

7. The terminal end of the blankets must be anchored in a 6-inch-deep by 6-inch-wide trench. Staple into trench and backfill per manufacturer's recommendations.

3.02 INSTALLATION OF SYNTHETIC EROSION CONTROL MATERIAL ON SLOPES

A. Placement

1. Place erosion mat (C125, C350, P550, or equivalents) in the areas shown on the Design Drawings.

2. Begin 10 feet back from the top of the slope by anchoring the blanket in a 6-inch-deep by 6-inch-wide trench.

3. Staple into trench and backfill per manufacturer's recommendations.

4 Roll the blankets down or horizontally across the slope.

5. The edges of parallel blankets must be stapled with approximately 5-inch overlap.

6. When blankets must be spliced down the slope, place blankets end over end (shingle style) with approximately 4-inch overlap. Water should flow from upslope mat onto downslope mat without flowing under. Staple through overlapped area, approximately 12 inches apart.

7. Staple the entire length over the width of the slope. Use the recommended staple pattern from paragraph 3.03 based on application, slope, and slope length (or an alternative method approved through the RFI process).

3.03 STAPLE PATTERNS

A. General

1. Table B lists staple patterns shall be used for erosion control materials placed on slopes.

Table B

Slope Length	Slope			
(feet)	4:1	3:1	2:1	1:1
300	B	C	C	C
275	B	C	C	C
250	B	C	C	C
225	B	B	C	C
200	B	B	C	C
175	B	B	C	C
150	A	B	C	C
125	A	A	C	C
100	A	A	C	C
75	A	A	B	C
50	A	A	B	B
25	A	A	B	B

a. Staple Pattern "A"

0.7 staples per square yard using 6-inch, 11-gauge wire "U" staples. 8-inch staples and longer may be used for loose soils. 9-gauge wire staples or heavier may be necessary in hard or rocky soils. Staples shall be placed along the long edge at 6.0-foot intervals and staggered along the shorter edge at 6.5-foot intervals. See the Staple Pattern Template at the end of this Specification.

b. Staple Pattern "B"

1.15 staples per square yard using 6-inch, 11-gauge wire "U" staples. 8-inch staples and longer may be used for loose soils. 9-gauge wire staples or heavier may be necessary in hard or rocky soils. Staples shall be placed along the long edge at 6-foot intervals and staggered along the shorter edge at 3-foot intervals and 1.5-foot intervals from the edge. See the Staple Pattern Template at the end of this Specification.

c. Staple Pattern "C"

1.7 staples per square yard using 6-inch, 11-gauge wire "U" staples. 8-inch staples and longer may be used for loose soils. 9-gauge wire staples or heavier may be necessary in hard or rocky soils. Staples shall be placed along the long edge at 4-foot intervals and staggered along the shorter edge at 2-foot intervals and 1.5-foot intervals from the edge. See the Staple Pattern Template at the end of this Specification.

d. Staple Pattern "D"

3.4 staples per square yard using 6-inch, 11-gauge wire "U" staples. 8-inch staples and longer may be used for loose soils. 9-gauge wire staples or heavier may be necessary in hard or rocky soils. Staples shall be placed along the long edge at 2-foot intervals and along the shorter edge at 20-inch intervals. See the Staple Pattern Template at the end of this Specification.

e. Staple Pattern "E"

3.75 staples per square yard using 6-inch, 11-gauge wire "U" staples. 8-inch staples and longer may be used for loose soils. 9-gauge wire staples or heavier may be necessary in hard or rocky soils. Staples shall be placed along the long edge at 2-foot intervals. Short edge rows shall alternate between 20-inch intervals starting at the edge and 20-inch intervals starting from an additional staple placed 10 inches from the edge. See the Staple Pattern Template at the end of this Specification.

3.04 MAINTENANCE

A. The SUBCONTRACTOR shall maintain the temporary and permanent vegetation, erosion and sediment control measures, and other protective measures in good and effective operating condition by performing routine inspections to determine condition and effectiveness, by restoration of destroyed vegetative cover, and by repair of erosion and sediment control measures and other protective measures as per RFETS erosion control procedures.

*****END OF SECTION*****

ATTACHMENT

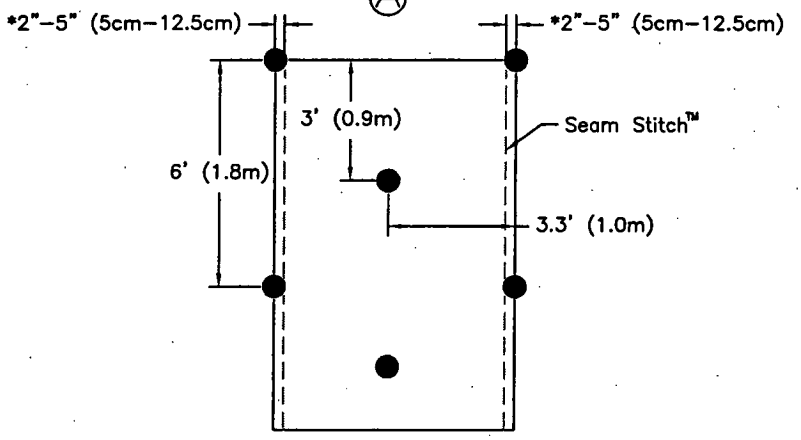
STAPLE PATTERNS "A" THROUGH "E" FROM NORTH AMERICAN GREEN

STAPLE PATTERN GUIDE

NORTH AMERICAN GREEN

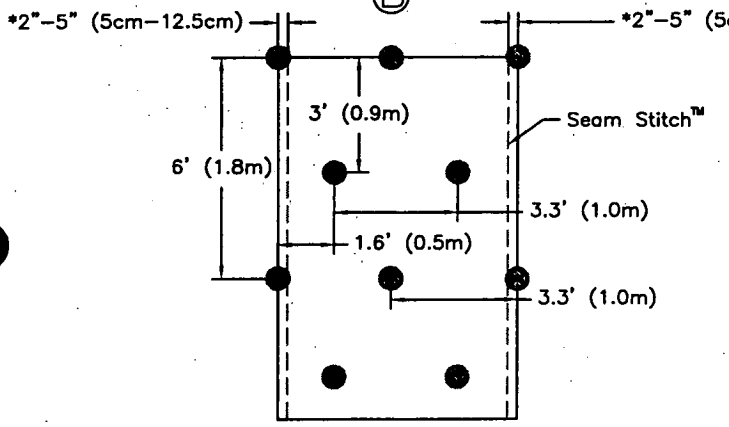
14649 HIGHWAY 41 NORTH
EVANSVILLE, IN 47725
USA 1-800-772-2040
CANADA 1-800-448-2040
www.nagreen.com

Ⓐ



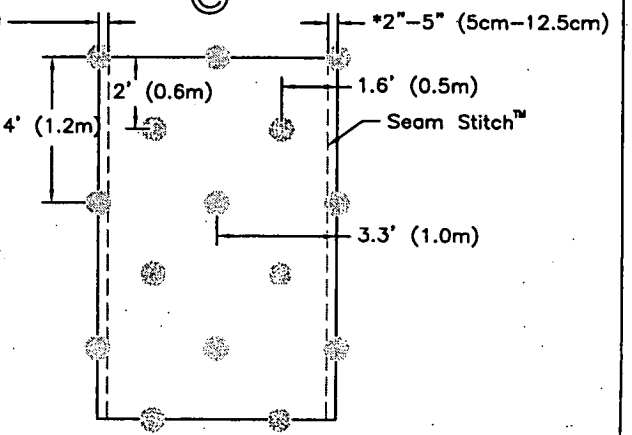
0.7 STAPLES PER SQ. YD.
(0.8 STAPLES PER SQ. M)
For blankets with the optional North American Green DOT System™ place staples/stakes through each of the BLUE colored dots.

Ⓑ



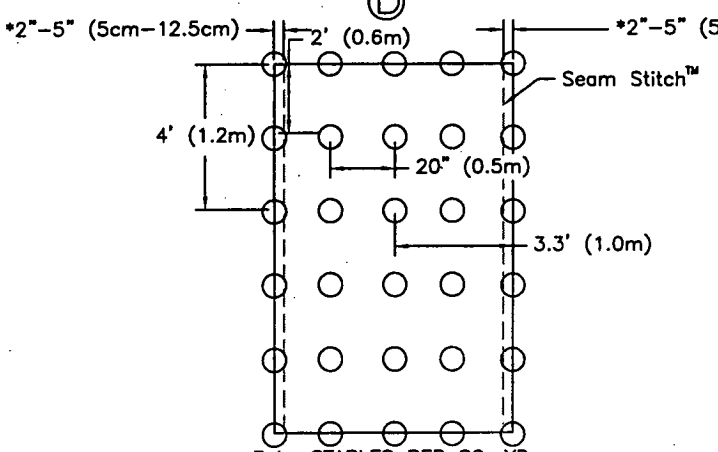
1.15 STAPLES PER SQ. YD.
(1.35 STAPLES PER SQ. M)
For blankets with the optional North American Green DOT System™ place staples/stakes through each of the RED colored dots.

Ⓒ



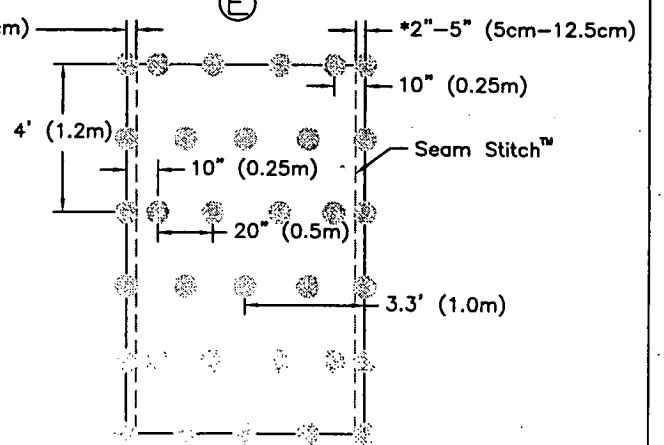
1.7 STAPLES PER SQ. YD.
(2.0 STAPLES PER SQ. M)
For blankets with the optional North American Green DOT System™ place staples/stakes through each of the GREEN colored dots.

Ⓓ



3.4 STAPLES PER SQ. YD.
(4.1 STAPLES PER SQ. M)
For blankets with the optional North American Green DOT System™ place staples/stakes through each of the WHITE colored dots.

Ⓔ



3.75 STAPLES PER SQ. YD.
(4.5 STAPLES PER SQ. M)
For blankets with the optional North American Green DOT System™ place staples/stakes through each of the YELLOW colored dots.

*Location of Seam Stitch™ will vary depending on North American Green product type:

Original Landfill Accelerated Action

Design Specifications Division 2

SPEC-02228-0987
EROSION CONTROL

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

_____

PROJECT CHIEF ENGINEER DATE

SPEC-02228-0987
EROSION CONTROL

PART 1 GENERAL

1.01 SUMMARY

A. Specifications for erosion control components and their installation. All activities performed by the SUBCONTRACTOR shall be in accordance with all applicable Federal, State, and local laws and regulations and RFETS erosion control procedures.

1.02 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. The most recent version of the reference test methods shall be used in all cases.

1. American Society for Testing and Materials (ASTM)

a. ASTM D 3786 Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics - Diaphragm Bursting Strength Tester Method

b. ASTM D 4439 Standard Terminology for Geotextiles

c. ASTM D 4491 Water Permeability of Geotextiles by Permittivity

d. ASTM D 4533 Trapezoid Tearing Strength of Geotextiles

e. ASTM D 4632 Grab Breaking Load and Elongation of Geotextiles

f. ASTM D 4751 Determining Apparent Opening Size of a Geotextile

g. ASTM D 4873 Identification, Storage, and Handling of Geotextiles

1.03 GENERAL

A. The SUBCONTRACTOR shall implement the storm water pollution prevention measures specified in this section, and outlined in the Work Control Document(s) in a manner which will ensure that all soils are retained on-site.

1.04 EROSION AND SEDIMENT CONTROLS

A. The controls and measures required by the SUBCONTRACTOR are described below.

1. Stabilization Practices

The stabilization practices to be implemented shall include geotextiles, erosion control mats, and preservation of mature vegetation.

2. Structural Practices

Structural practices shall be implemented as per RFETS erosion control procedures to divert flows from exposed soils, temporarily store flows, or otherwise limit runoff and the discharge of pollutants from exposed areas of the site. Structural practices shall be implemented in a timely manner during the construction process to minimize erosion and sediment runoff. Structural practices shall, as a minimum, include the following devices, as applicable:

a. Silt Fences

The SUBCONTRACTOR shall maintain existing silt fences and provide additional silt fences as necessary for temporary structural practice to minimize erosion and sediment runoff. Silt fences shall be properly installed to effectively retain sediment immediately after completing each phase of work where erosion would occur in the form of sheet and rill erosion (e.g., clearing and grubbing, excavation, embankment, and grading).

b. Straw Bales and/or Straw Waddles

The SUBCONTRACTOR shall provide bales of straw and/or straw waddles as a temporary structural practice to minimize erosion and sediment runoff. Bales and/or waddles shall be placed to effectively retain sediment immediately after completing each phase of work (e.g., clearing and grubbing, excavation, embankment, and grading) in each independent runoff area.

c. GeoRidge®

The SUBCONTRACTOR shall provide GeoRidges® as a temporary structural practice to minimize erosion and sediment runoff. GeoRidges® shall be placed to effectively retain sediment immediately after completing each diversion berm and side channel phases of work.

PART 2 PRODUCTS

2.01 COMPONENTS FOR SILT FENCES

A. Filter Fabric

1. The geotextile shall comply with the requirements of ASTM D 4439 and shall consist of polymeric filaments which are formed into a stable network such that filaments retain their relative positions. The filament shall consist of a long-chain synthetic polymer composed of at least 85 percent by weight of ester, propylene, or amide and shall contain stabilizers and/or inhibitors added to the base plastic to make the filaments resistance to deterioration due to ultraviolet and heat exposure. Synthetic filter fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 to 120 degrees F. Unless otherwise approved by the SQAM or CONTRACTOR, the filter fabric shall meet the following requirements:

Table A
Filter Fabric For Silt Screen Fence

Physical Property	Test Procedure	Strength Requirement
Grab Tensile Elongation (%)	ASTM D 4632 (30% max.)	100 lbs. min.
Trapezoid Tear	ASTM D 4533	55 lbs. min.
Mullen Burst	ASTM D 3786	270 lbs. min.
Permittivity	ASTM D 4491	0.2/sec
AOS (U.S. Std Sieve)	ASTM D 4751	20-100

B. Silt Fence Stakes and Posts

1. The SUBCONTRACTOR may use either wooden stakes or steel posts for fence construction. Wooden stakes utilized for silt fence construction shall have a minimum cross section of 2 inches by 2 inches when oak is used and 4 inches by 4 inches when pine is used, and shall have a minimum length of 5 feet. Steel posts (standard "U" or "T" section) utilized for silt fence construction shall have a minimum weight of 1.33 pounds per linear foot and a minimum length of 5 feet.

2.02 COMPONENTS FOR STRAW BALES AND/OR WADDLES

A. The straw in the bales and waddles shall be stalks from oats, wheat, rye, barley, or rice, furnished in air-dry condition. The bales shall have a standard cross section of 14 inches by 18 inches. All bales shall be either wire-bound or string-tied. The SUBCONTRACTOR may use either wooden stakes or steel posts to secure the straw bales to the ground. Wooden stakes utilized for this purpose shall have a minimum dimensions of 2 inches x 2 inches in cross section and shall have a minimum length of 3 feet. Steel posts (standard "U" or "T" section) utilized for securing straw bales, shall have a minimum weight of 1.33 pounds per linear foot and a minimum length of 3 feet.

2.03 COMPONENTS FOR GEORIDGES

A. The GeoRidge® system comprises a series of synthetic, porous berms installed perpendicular to the direction of flow. The GeoRidge® berms are constructed of a UV-stabilized high-density polyethylene. GeoRidge® is designed to increase channel and slope roughness to reduce flow velocity. Where soils are very loose or very firm, use 250 mm galvanized spikes with washers.

PART 3 EXECUTION

3.01 INSTALLATION OF SILT FENCES, STRAW BALES, AND STRAW WADDLES

A. Install as per RFETS erosion control procedures.

3.02 INSTALLATION OF GEORIDGES®

A. GeoRidge® shall be installed on top of the erosion control blanket for a given channel. For multiple GeoRidge® panels in the same row, overlap panels by minimum 50 mm (2 inches). Cut a slot in the crest of the overlapping berm to allow contact between the foot of the berm and the soil.

B. Anchor GeoRidge® with a 10 inch spike. Anchor spacing depends on soil condition and density. Minimum recommendation is 3 anchors on the upstream side and 2 anchors on the downstream side. Install to prevent water from going around or under the GeoRidge®.

C. Subsequent panels shall extend both across the bottom of the ditch and opposite the sideslope, as well as up the original backslope or sideslope at the distance determined by the Engineer.

D. Install as per manufacturer's recommendations if different from above.

3.03 MAINTENANCE

A. Maintain erosion controls as per RFETS erosion control procedures.

3.04 INSPECTIONS

A. General

1. The SUBCONTRACTOR shall inspect disturbed areas of the construction site as per RFETS erosion control procedures.

END OF SECTION

Original Landfill Accelerated Action

Design Specifications Division 2

SPEC-02245-0988
STONE AND AGGREGATE MATERIALS

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

_____

PROJECT CHIEF ENGINEER DATE

SPEC-02245-0988
STONE AND AGGREGATE MATERIALS

PART 1 GENERAL

1.01 SUMMARY

A. This specification section covers the supply, installation, and testing of stone protection materials for the central channel as shown on the Drawings. All activities performed by the SUBCONTRACTOR or any subcontractor at any tier shall be in accordance with all applicable Federal, State, and local laws and regulations.

1.02 REFERENCES

A. The publications listed below form a part of the specification to the extent referenced. The publications are referred to in the text by basic designation only. The most recent version of the referenced Test Methods shall be used in all cases.

1. American Society for Testing and Materials (ASTM)

   a. ASTM C 88 Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate

   b. ASTM C 127 Specific Gravity and Absorption of Coarse Aggregates

   c. ASTM C 131 Resistance to Degradation of Small-size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

   d. ASTM D 422 Method for Particle Size Analysis of Soils

1.03 SUBMITTALS

A. The SUBCONTRACTOR will prepare the following submittals for review by the CONTRACTOR in accordance with Section 01305 SUBMITTAL PROCEDURES:

1. Suppliers' Test Results demonstrating compliance with Part 2 and stone geologic source.

1.04 EQUIPMENT

A. All equipment and tools used in the performance of the work will be subject to approval by the CONTRACTOR before the work is started and shall be maintained in satisfactory working condition at all times.

1.05 CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL

A. The SUBCONTRACTOR shall abide by all qualification and submittal requirements of the QA/QC Plan and the Work Control Document(s) (WCD).

B. The work will be monitored and tested at the appropriate frequencies in accordance with the requirements of the approved QA/QC plan.

PART 2 PRODUCTS

2.01 MATERIALS

A. Riprap

1. Stone used for riprap shall be hard, dense, angular in shape, resistant to weathering, and free from seams, cracks or other structural defects. The stone shall have a specific gravity of at least 2.60. Each piece shall have its greatest dimension not greater than four times its least dimension. The riprap shall be reasonably well-graded from coarse to fine, falling within the limits of the gradation requirements given in Table A.

2. Control of gradation will be by visual inspection and the supplier's gradation submittal as shown in Table A.

Table A
RIPRAP GRADATION REQUIREMENTS

D_{50} stone size[1] (inches)	% of Material Smaller Than Typical Stone[2]	Typical Stone Dimensions[3] (inches)	Typical Stone Weight[4] (pounds)
6	70-100	12	85
	50-70	9	35
	35-50	6	10
	2-10	2	0.4
9	70-100	15	160
	50-70	12	85
	35-50	9	35
	2-10	3	1.3
12	70-100	21	440
	50-70	18	275
	35-50	12	80
	2-10	4	3

Notes:
[1]D_{50} = Nominal stone size
[2]Based on typical rock weight
[3]Equivalent spherical diameter
[4]Based on specific gravity=2.60

B. Boulders

1. Boulders shall be hard, dense, angular in shape, resistant to weathering, and free from seams, cracks or other structural defects. The stone shall have a specific gravity of at least 2.60. Boulders shall be at least 24-inches in one dimension so that when buried 6-inches, 18-inches are exposed.

PART 3 EXECUTION

3.01 PREPARATION

A. Areas on which separation geotextile, bedding material, riprap, or boulders are to be placed shall be graded and dressed to lines and grades shown on the drawings and in accordance with Section 02110 SITE PREPARATION. Eroded or washed-out areas shall be repaired prior to placement of material.

3.02 STONE

A. General

Riprap and boulders shall be placed within the limits shown on the drawings.

B. Placement

1. Riprap stone shall be placed in such manner as to produce a reasonably well-graded mass of rock with the minimum practicable percentage of voids. Riprap shall be placed to its full course thickness in one operation. The larger stones shall be well distributed and the entire mass of stones in their final position shall be roughly graded to conform to the gradation specified. The finished riprap shall be free from objectionable pockets of small stones and clusters of larger stones. The desired distribution of the various sizes of stones throughout the mass shall be obtained by selective loading of the material at the quarry or other source and by controlled dumping of successive loads during final placing and placement. Zero drop height placement procedures are to be utilized for riprap stone. Rearranging of individual stones by mechanical equipment or by hand will be required to the extent necessary to obtain a reasonably well-graded distribution of stone sizes as specified above. Riprap shall be placed from down slope to up slope to form a continuous buttress of rock as placement progresses.

2. Boulders shall be spaced per the design drawings. Placement will begin with the excavation of a 6-inch deep hole wide enough to bury the bottom 6-inches of the boulder. Erosion mat per the design drawings will be placed over the hole followed by placement of the boulder. The erosion mat shall be scored or cut in the area over the hole prior to boulder placement to limit tension of the erosion mat. The boulder will be placed so that 6-inches are buried and a minimum of 18-inches is above grade within the channel bottom. Alternatives methods may be used by the SUBCONTRACTOR so long as erosion mat or other separation layer such as geotextile is located under the boulder.

3.04 GROUTING

A. Where shown on the Drawings, fill spaces between stones with cement mortar. Use sufficient amount of mortar to fill voids and leave face surface of stone exposed. Place grout from bottom to top and sweep surface with stiff broom. After grouting is completed, wet-cure surface.

3.05 PROTECTION

A. The SUBCONTRACTOR shall maintain the riprap stone and boulders until accepted and any material displaced by any cause shall be replaced.

END OF SECTION

Original Landfill Accelerated Action

Design Specifications Division 2

SPEC-02720-0989
LIQUIDS REMOVAL

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

_____

PROJECT CHIEF ENGINEER DATE

SPEC-02720-0989
LIQUIDS REMOVAL

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Sources

Liquid sources include personnel and vehicle cleaning activities and incidental waters. Free liquids consist of liquids from spills, contaminated runoff, and liquids encountered during excavation.

B. Procedures

The SUBCONTRACTOR shall be responsible for the characterization, collection, removal, and disposal of liquids in accordance with all Rocky Flats Environmental Technology Site (RFETS) Standard Operating Procedures (SOPs).

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.01 INCIDENTAL WATERS

A. Incidental waters will be handled as per RFETS SOPs.

END OF SECTION

75

Original Landfill Accelerated Action

Design Specifications Division 2

SPEC-02900-0990
SEEDING

APPROVED	APPROVED AS CORRECTED
NOT APPROVED	REVISE AND SUBMIT

APPROVAL IS FOR CONFORMANCE TO THE SITE DESIGN PROCESS AND WITH THE DESIGN CONCEPT OF THE CALCULATIONS, PLANS, AND SPECIFICATIONS.

_____

PROJECT CHIEF ENGINEER DATE

SPEC-02900-0990
SEEDING

PART 1 GENERAL

1.01 SUMMARY

A. The vegetation requirements for seeding shall be as described in the plans referenced below. All activities performed by the SUBCONTRACTOR shall be in accordance with all applicable Federal, State, and local laws and regulations.

1.02 REFERENCES

A. The following publications listed below form a part of the Specification to the extent referenced. The publications are referenced in the text by basic designation only. The most recent version of the referenced test methods shall be used in all cases.

1. American Society for Testing and Materials

   a. ASTM D 2974 Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils

2. U.S. Department of Agriculture Federal Seed Act of 9 August 1939 (55 Stat. 1275)

1.03 SUBMITTALS

A. The SUBCONTRACTOR will prepare the following submittals for review by the CONTRACTOR and the QCSM in accordance with Section 01305 SUBMITTAL PROCEDURES:

1. Manufacturer's Catalog Data:

   Manufacturer's standard catalog data giving the brand names and catalog numbers of erosion control materials, in sufficient detail to demonstrate complete compliance with this section.

2. Manufacturer's Instructions:

   The manufacturer's installation instructions and procedures.

3. Approval of Materials:

   Material sources and material test results prior to field use.

4. Certified copy of seed analysis.

5. Seed bag tickets.

77

1.04 CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL

A. The SUBCONTRACTOR shall abide by all qualification and submittal requirements of the QA/QC Plan and the Work Control Document(s) (WCD).

B. The work will be monitored and tested at the appropriate frequencies in accordance with the requirements of the approved QA/QC Plan.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery

Material used for seeding, such as seed, fertilizer, hay, hay bales, blankets, etc., shall be inspected upon arrival at the job site.

B. Storage

Seed shall be protected from any drying, moisture or contamination by detrimental material upon delivery and when being stored.

PART 2 PRODUCTS

2.01 SEED

A. Follow the RFETS Revegetation Plan (January 2004 revision 2). The pure live seed (PLS) mixture to be used shall be as follows:

1. Seed Mixture:

a. The seed is to be ordered as PLS.

b. The seed must be certified weed-free.

c. Seed is to be ordered and bagged separately by species (i.e., the seed company should deliver all the seed in separate bags by species). This allows Site ecologists to examine the seed for purity prior to seeding.

d. Seed bag tags will be pulled off the bags and provided to the CONTRACTOR.

2.02 NUTRIENT AMENDED SOIL/TOPSOIL

A. As per the RFETS Revegetation Plan (January 2004 revision 2) RFETS Revegetation Plan.

2.03 SOIL EROSION CONTROL MATERIAL AND STAPLES

A. Erosion control materials shall conform to Section 02228 EROSION CONTROL

1. Synthetic Erosion Control Materials

2. Silt Control Fence

3. Straw Bales

PART 3 EXECUTION

3.01 As per the current RFETS Revegetation Plan.

*****END OF SECTION*****